DOCUMENT RESUME

ED 031 242 JC 690 283

By-Couch, James Robert

An Experiment to Determine the Effectiveness of a Summer Preparatory Program at Spartanburg Junior College.

Pub Date [69]

Note-41p.

EDRS Price MF-$0.25 HC-$2.15

Descriptors-*Developmental Programs, *Experimental Programs, *Junior Colleges, *Summer Programs

Identifiers-South Carolina

The study proposed to determine if an 8-weeks' summer preparatory program in English, math, reading, study aids, science, and group dynamics would enable a particular group of 51 students to compete academically in the first semester of the 1968-69 school year with 51 regularly admitted students. The experimental group was chosen from those required to take the 8-week program before admittance to the college; the control group, from regular students whose academic load was limited to four courses. The pairs were matched by college board scores within plus or minus 20 points. After the summer session, students from the experimental group were enrolled in the regular session. At the end of the first semester, GPA's for both groups were analyzed by a t-test. The analysis showed that the experimental group surpassed the regular group in academic achievement, though not to a significant degree. The author concludes that the summer program is therefore worthwhile. He recommends (1) that the developmental program be continued, (2) that a follow-up study be made at the end of five years to see if the difference between the groups remains the same, and (3) that similar studies of wider scope be made to confirm or refute these findings. (HH)

ED031242

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

# AN EXPERIMENT TO DETERMINE THE EFFECTIVENESS OF A SUMMER PREPARATORY PROGRAM AT SPARTANBURG JUNIOR COLLEGE

BY

JAMES ROBERT COUCH

JC 690 283

UNIVERSITY OF CALIF.
LOS ANGELES

JUL 23 1969

CLEARINGHOUSE FOR
JUNIOR COLLEGE
INFORMATION

## ABSTRACT

The purpose of this study was to determine if eight week's summer preparatory program in English, mathematics, reading, aids to study, science and group dynamics enabled a group of students to compete academically during the first semester of the 1968-69 school year with a group of regularly admitted students.

The experimental group was selected from students who were required to take an eight week's preparatory program before they could be admitted to Spartanburg Junior College. The control group was selected from regularly admitted students whose academic load was limited to four courses. The pairs were matched by college board scores within plus or minus twenty points.

After the summer session, students in the experimental group were enrolled in the regular college curriculum. At the end of the first semester, grade point ratios for both groups were computed and statistically analyzed by means of a *t* test.

# CHAPTER I

## INTRODUCTION

During the first semester of the 1968-69 academic school year at Spartanburg Junior College, a study was conducted to measure the statistical differences in academic achievement of a selected group of selected regularly admitted students. The control and experimental groups included in the study consisted of a combine total of one-hundred and two students.

### I. Setting

Spartanburg Junior College is a two-year liberal arts college operating under the joint sponsorship of the South Carolina Annual Conference of the United Methodist Church. The college offers the Associate of Arts Degree in the liberal arts and sciences and the Junior College Diploma in the areas of secretarial science and general education. The college has an enrollment of 750 full-time students for the academic year 1968-69.

Located in the Piedmont region of South Carolina, two miles from the junction of Interstate Highways 26 and 85, Spartanburg Junior College serves one of the most rapidly growing areas of the South. The city of Spartanburg has four institutions of higher education; Wofford College for men (Methodist), Converse College for women (private), a two-year regional branch of the University of South Carolina and Spartanburg Junior College. Spartanburg Junior College is the only coeducational institution located in Spartanburg and the only two-year institution operated by the United Methodist Church in South Carolina.

The overwhelming desire and purpose of Spartanburg Junior College is to make continuing significant contributions to the educational life of the region. The college is making every effort, within the limit of her resources, to improve the educational program by establishing priorities and by rigorous self examination.

## II. The Problem

Statement of Problem. The purpose of this study was to determine whether a selected group of fifty-one students made sufficient progress in an eight weeks summer preparatory program in the summer of 1968 at Spartanburg Junior College to compete academically with a selected group of fifty-one regularly admitted students during the first semester of the 1968-69 school year.

Limitations of Study. The study was limited to an experimental group of fifty-one students who were admitted to Spartanburg Junior College from the eight weeks summer preparatory program in reading, mathematics, English, science, aids to study, and group dynamics, and to a control group of fifty-one students who were admitted to the college without the developmental study and who could be matched with the developmental program students on the basis of college board scores, within plus or minus twenty points. College academic achievement was measured by the students' first-semester average during the 1968-69 academic school year.

Significance of Problem. For many years developmental teaching has been considered primarily an elementary and secondary-school responsibility. Recently, educators in junior colleges have recognized the necessity for continuing developmental instruction beyond elementary and secondary levels in order to meet the needs of students who encounter difficulties in pursuing a college education because of ineffective study habits.

Students who have not acquired sufficient mastery of English, mathematics, and reading have difficulty in college. Every college teacher has encountered a number of students who were handicapped in their reading habits, English comprehension and ability to solve problems. Because of these deficiencies, many students labor under great stress in performing academic activities required of them at the college level. Unless developmental instruction is provided for such students, correction of their deficiencies is dependent on their own efforts and on incidental instruction received in connection with other courses.

Colleges and universities have been steadily setting higher admission requirement for the past decade in an attempt to alleviate mediocrity and develop superior students.[1] This has necessitated the upgrading of scholastic requirements in elementary and secondary schools and the increasing of admission requirements at the junior college level in order to compete effectively with senior colleges.

Academic achievement is dependent on students' ability to read, to comprehend and to solve problems. A student who possess adequate reading ability, comprehension, and problem-solving techniques is prepared to master academic skills. Such mastery may prevent frustration, anxiety, social-personal malajustment, and failure.

Questions to be answered. (1) Were the developmental students able to compete academically, as measured by grade point ration, with the regularly admitted students after having been admitted to Spartanburg Junior College from

---

[1]Benjamin Fine, Admission to American Colleges: A Study of Current Policy and Practice (New York, 1946), pp. 62-67

an intensive eight-weeks of developmental study? (2) Can it be inferred that an intensive developmental program in English, reading and mathematics prior to entry into Spartanburg Junior College enhanced the comprehension and problem-solving ability of the prospective students?

## III. TERMS AND DEFINITIONS

Developmental Instruction. The instruction deemed necessary to aid the student to progress in study habits and knowledge during a given period of time, in order that he or she will have a better foundation in basic scholastic requirements essential for success in beginning college work.

Developmental Student. A student who, for various reasons, does not show competency to master beginning college work at the completion of secondary school education, as determined by the consideration of his high school transcript, college board scores, standardized tests, class rank, and the general recommendation of officials of the high school from which he graduated.

Developmental Course. A non-credit course which is taken as a requirement or voluntarily by a student to develop fundamental study skills.

Regular Student. One who has been admitted to college after evaluation of his high school transcript, college board scores, standardized tests, class rank, and the general recommendation of officials of the high school from which he graduated.

## CHAPTER II

## REVIEW OF THE LITERATURE

During the past three decades a large amount of data has been gathered showing that schools have failed in many cases to adapt their curriculum and methods of teaching to individual differences in ability, interests, and study skills. In an attempt to remedy these conditions, many schools have conducted studies to determine causes of this failure and have made certain modifications which have greatly improved many situations.

### I. DIAGNOSTIC AND DEVELOPMENTAL TEACHING

Remedial teaching is an integral part of all good teaching. It is an activity that should begin early in elementary school and continue into college. The main objective of remedial instruction is to remedy or remove poor teaching, poor learning, and poor study habits.[1] It is based on diagnosing causes and defects, and subsequently eliminating ineffective habits and correcting weaknesses. The term "remedial" includes another method of teaching known as developmental which attempts to teach students for the first time basic skills which are lacking. It is not the purpose of developmental teaching to correct faults and eliminate defects.[2]

---

[1]Glenn Myers Blair, Diagnostic and Remedial Teaching (New York, 1962), pp. 13-15

[2]Blair, pp. 13-15.

Administrators, supervisors, and teachers are generally aware of the problems created by the presence of increasingly large numbers of students unequipped to meet study demands required in various subject areas.[3] Remedial teaching is concerned with two problems: the presence of ineffective study habits and the absence of good habits.[4] Developmental teaching is concerned with the educational strengths of the students in providing motivation for the development of new and better skills. Paul Whitty refers to the lack of skills as one in which many teachers consider reading retardation the greatest obstacle to effective instruction.[5]

## II. PROBLEMS AND DIAGNOSIS IN READING

Failure in reading is the basic problem for the underachiever. It is stressed before a child enters school, and is continued throughout the life span of the child. The child who is unable to read is considered a failure, and this failure becomes an everyday experience for him, as he is constantly reminded of it. He has difficulty in comprehension as well as problem solving because he lacks the needed reading ability. Sometimes when parents punish to obtain the desired results, year by year failure becomes worse until someone recognizes the problem.

---

[3]Joan Marie Kirby, "Classroom Techniques for Diagnosis and Remedial Instruction" (Unpublished Master's Thesis, Southern Connecticut State College, 1961), p. 25.

[4]Kirby, p. 20

[5]Paul Whitty, Reading in Modern Education (Boston, 1949), p. 1.

Auditory. The extent to which poor hearing may be a factor in producing reading difficulties is not definitely known. A study by Bond showed that elementary school children who had partial hearing were severly handicapped in classes which stressed phonetics.[6] Numerous tests and devices are available for appraising the hearing sensitivity of students.

Visual. If a student cannot see, it is obvious he cannot read printed material without developing eyestrain, headaches, nervous tension, and other ailments that may make reading an unpleasant activity. If he is unable to read because of eye difficulty, then he is unable to improve his comprehension and problem solving ability. All individuals who have poor vision are not retarded readers, however.

There are many tests and visual devices that can be used by the teachers and school to measure visual difficulties. They range from the A. M. A. Rating Reading Card[7] to the Keystone Telebinocular[8] device that is used to diagnosis astigmatism, musclar imbalance, and other defects.

Speech. Many poor readers have some type of speech defect. Stuttering and stammering often cause retardation in reading because they tend to retard the language development of the child. The student may

---

[6]Guy L. Bond, Auditory and Speech Characteristics of Poor Readers (New York: Columbia University, 1935), p. 18.

[7]American Medical Association, 535 North Dearborn Street, Chicago, Illinois.

[8]Keystone View Company, Meadville, Pennsylvania.

develop inferior feelings and refuse to read orally. A teacher should be aware of these feelings and not force the child to read aloud. Personality disorders and emotional difficulties may develop from speech defects when the person recognizes that he is different.

It is possible, however, for a speech defect to result from wrong habits. Many of these cases are the result of baby talk and can be corrected by proper diagnosis and proper corrective techniques. It is often a case of practice by the student and reminding by the teacher, but there should never be pressure by the teacher or parents to cause self-consciousness. The student should understand what is being done and reasons for doing it.

Social and Emotional. Emotional factors are frequently asscciated with remedial students, although physical factors may be responsible for the emotional situation. For instance, a child may become frustrated and anxious because of left handedness if constant pressure is applied to change to the other hand. Emotion has been defined as a "disorganized response, occurring when the individual is frustrated or baffled."[9]

Numerous psychological studies have shown the serious effects of anxiety and frustration upon the learning situation.[10] If a child had met

---

[9]S. L. Pressey, J. E. Janney, and R. G. Kuhlen, Life: A Psychological Survey (New York, 1939), p. 564.

[10]H. D. Carter, "Emotional Correlates of Errors in Learning," Journal of Educational Psychology, XXVII January, 1936, pp. 55-67.
of

failure again and again, he frequently will develop a phobia toward reading which hinders his progress. Many times the retarded reader has encountered emotional difficulties prior to entry into school. Some of the difficulties are insecurity in the home, parents who are overprotective or neurotic and who desire more than their children can achieve. These conditions place the child in an emotional state in which effective reading habits cannot be developed.

A careful study of the underachiever should be made before learning techniques are begun. Reading difficulties resulting from emotional problems should be evaluated carefully. Some cases may require the assistance of a person trained in psychology who is adept at analyzing and treating complex personal problems.

Mental. There is dissensus among psychologists as to what intelligence is, and to what extent it is affected by enviromental influences. Psychometrists and others who have worked with children retarded in reading have found certain intelligence tests useful in diagnosing problems. If a student scores high on an intelligence test and is deficient in reading ability, certain conclusions may be drawn which would be impossible if these data were lacking.[11]

A careful selection of tests is important in testing poor reading; it is highly desirable to use tests which do not involve reading. Some of them

---

[11]Blair, pp. 48-59

are The Revised Standford-Binet Scale, Chicago Non-Verbal Test, The Arthur Performance Scale, the Printer Non-Language Intelligence Test, and the Wechsler-Bellevue Intelligence Test. Administration of these tests usually require a clinican or an individual highly trained in test techniques.

Other. Other factors which have been found to be associated with reading difficulties are lack of interest, meager experiential background, lack of reading experience, glandular disturbances, low vitality, and physical disease. Many theories which possess no validity have been suggested as causes of reading difficulties. One writer held that the nonreader is a biological anomaly, and others have claimed that congential word blindness is a frequent cause.[12] Some have been led to believe that reading disability is inherited as a sex-linked characteristic because there is greater incidence of reading disability among boys than among girls. However, this is an unproved assumption. The probability is that since girls mature earlier than boys, they respond quicker to initial reading instruction and are ahead of boys at later stages of their development. There is also the possibility that girls develop a deeper interest in reading while boys' interests often lie in other channels because of certain cultural factors.

---

[12]Blair, pp. 72-74

Developmental Techniques.[13] No two students are exactly alike with respect to reading disability, interest, and goals. Techniques should be dependent upon the diagnosis made of the particular case. However, there are several rules which are applicable to most underachievers. Five of these are: (1) start where the pupil is, (2) inform him of his progress by means of charts and graphs, (3) see that some basic goals of the student are being used, (4) praise the student for work well done, and (5) develop a program which includes a variety of activities and exercises to break monotony.

The student's reading vocabularly can be developed through extensive reading, appropriate dictionary work, systematic word study, study of prefixes, suffixes, and derivation of English words. For the nonreader, a basic from 50 to 70 per cent of the context of most reading matter, includes 220 words which should be recognized by all students above the third grade level.

Reading speed can be improved by extensive reading, use of time limits, and use of mechanical apparatuses.

Development of the power of comprehension is the primary goal of all reading improvement programs. The diagnosis of a particular case should indicate the difficulties responsible for poor comprehension. In general, wide reading in a specific area will furnish adequate background which will enable the individual to comprehend well in that field. Enrichment of vocabularly and practice in reading materials in various fields will help to develop a broader area of comprehension.

---

[13]Blair, pp. 81-110

## III. PROBLEMS IN MATHEMATICS

Many students in upper elementary grades, high shcools, and first-year college are deficient in fundamentals of mathematics. For example, when Wilson gave simple tests of basic operations in arithmetic to children in fifteen represnetative towns and cities in metrcpolitian Boston, he found that approximately 70 per cent of the seventh and eighth graders needed corrective instruction.[14] The tests used in this survey were the Wilson Process Test, revised, in addition, subtraction, multiplication, short division, and long division. These simple tests were made up of basic mathematical concepts but yet a majority of junior-high school age showed marked deficiencies in their use.

Causes of Difficulty. There are numberous causes of problems in fundamentals of mathematics. A careful diagnosis should be made of each student who is having difficulty in order that specific individual casual factors may be discovered. The diagnosis should include a thorough appraisal of student's physical condition, visual and auditory acuity, general mental ability, attitudes, interests work habits, specific error patterns, and home conditions. By making a careful study of each

---

[14] G. M. Wilson, "Toward Perfect Scores in Arithmetic Fundamentals," Arithmetic Teacher, I, December, 1954, pp. 14-15.

factor involved, it is possible to form a more accurate judgment of the causative factors of the student's disability. Ineffective work habits and specific errors of which the student is unconscious lie at the bottom of much trouble in mathematics.

Identifying Causes of Difficulties. There are informal methods which can be used to locate problems underlying mathematical deficiencies. Papers turned into the teacher and errors made in fundamentals on the blackboard are two informal sources for locating difficulties. More precise techniques for appraising arithmetic ability of pupils are found in standardized tests which test ability in mathematics. Stanford Mathematics Test,[15] California Mathematics Achievement Test,[16] and Lee-Clark Fundamentals Test[17] are only a few of the many standardized tests available to measure mathematical ability.

Developmental Treatment of Difficulties in Mathematics. Effectiveness of instruction in mathematics may be measured by the ability of the students:

(1) to think intelligently about quantitative aspects of their environment;

(2) to make application of mathematical principles in everyday activities;

(3) to perform essential computations with accuracy and facility.[18]

---

[15]Published by World Book Company, Yonkers-on Hudson, New York.

[16]Published by California Test Bureau, 5916 Hollywood Boulevard, Los Angeles 28, California.

[17]Published by California Test Bureau, 5916 Hollywood Boulevard, Los Angeles 28, California.

[18]Leo J. Brueckner and Ernest O. Melby, Diagonostic and Remedial Teaching (New York, 1931), pp. 1-180

Students are faced each day with quantitative terms and relationships of various kinds which they must be able to understand and read intelligently. Each student should acquire an appreciation of the value of precise measurement and accurate information to be gained through mathematics, and the application of mathematics to all of the curriculum. The student should learn to appreciate the value of numbers as a method by which man has brought arrangement, order, and precision to many aspects of his enviroment.[19]

Developmental teaching should be geared to develop skills that have been diagnosed as lacking in the student's processes and habits of work. Teachers should be aware of the pupil's goals and needs and should adjust the program to each individual. Each individual must experience success if rapid learning is to take place. Students should be aware of their progress and different instructional techniques should be introduced periodically to break the monotony. The teacher who is to be successful with developmental mathematics must be well equipped with the best psychological procedures and with a wealth of appropriate techniques and materials. Students must see that what they have learned is relevant to their own objectives.

---

[19]Brueckner and Melby, pp. 1-180.

## IV. DEFICIENCIES IN ENGLISH

Students need to know how to read, but they must also be able to communicate both orally and in writing. The degree of proficiency needed in basic skills of English will vary with individuals, but in a democratic society, each individual needs to have mastered both oral and written language.[20]

Functions of Language.[21] The most fundamental task of the schools is the training in language. It is both a form of reaction and a mode of behavior of the individual as he exchanges ideas and experiences. Language makes it possible to establish and maintain contact with "vast accumulations of knowledge of the ages." The human race is able to maintain a level of behavior above the lower forms of animal life because of language. It should be the purpose of instruction in oral and written composition to develop within the individual the ability to express their ideas, relate experiences in a clear, direct, interesting and forceful manner.

Complexity of Language. The division of language are rhetorical factors such as vocabulary, logical organization, and grammatical construction and formal factors such as punctuation, pronunciation, enunciation, and spelling. These factors are essential in both oral and written language.

---

[20]Brueckner and Melby, pp. 331-333.

[21]Brueckner and Melby, pp. 330-335

Whether writing or speaking, an individual should say precisely what is meant in grammatically correct and well constructed language. Because of the importance of this today, schools are emphasizing greater language facility.[22]

Frequent Errors in Oral English. Many studies have been conducted in regard to types of errors made in oral English. A study was conducted at the Fort Hill High School, Cumberland, Maryland, with cooperation of the English department. A tabulation of errors was made by the students for one week. It was found that 77 per cent used the wrong verb form, confused past and present participles, failed to make verbs agree with their subjects in person and number, and used wrong tenses. The remaining 23 per cent made errors such as use of double negatives, improper pronouns, and such expressions as "Where's it at?" Five per cent of the rrors were of miscellaneous variety.[23]

Lyman has analyzed types of errors in oral English found by an investigator who conducted studies among secondary school children in Kansas City; Bonham, Texas; Columbia, Missouri; Detroit; Hibbing, Minnesota; and Pittsburgh. The data showed that 49 to 62 per cent of the errors involved verb forms, 9 to 21 percent involved syntactical redundancy, 10 to 14 per cent involved pronouns, 8 to 14 per cent consisted of double negatives, 1 to 6 per cent were due to confusion of prepositions and conjunctions and 0 to 1 per cent of the errors come from misplacing modifiers.[24]

---

[22]Brueckner and Melby, pp. 330-335

[23]Blair, pp. 327-350

[24]Blair, pp. 332-335

Compositional Errors. Many of the same errors appear both in oral and written language, but overlapping is by no means complete. Such errors as punctuation, capitalization, and spelling do not show in oral English. A study was conducted in Wuincy, Illinois, by a ninth-grade teacher of English who analyzed all themes which were written under her supervision during an eight-weeks' period. A total of 1,112 themes was written by 147 pupils, and the themes were checked for errors. After a compilation of data, the study revealed that failure to use commas properly was the most persistant error in punctuation. Use of capital letters for common names was the most frequent capitalization error. The most numerous type of sentence-structure errors was run-on sentences. Misuse of verbs was the most frequent grammatical error, with errors involving pronouns running a close second.[25]

Developmental English teachers could conduct similar studies to discover the most common errors of their pupils and use the data to develop a better program of instruction adapted to the students' needs, interests, abilities, and limitations. A teacher can detect many errors in English and committed by the students through analyzing their oral and written compositions.

There are also standardized tests to diagnose deficiencies such as: Barrett-Ryan-Schrammel English test,[26] Tressler Minimum Essentials Test,[27] Rinsland-Beck Natural Test of English Usage,[28] and Cooperative English Test, Form A and B[29] which can be given to diagnosis deficiencies.

---

[25]Blair, pp. 350-386.

[26]World Book Company, Yonkers-on Hudson, New York.

[27]Published by the Public School Publishing Company, Bloomington, Ill.

[28]Published by the Public School Publishing Company, Bloomington, Ill.

[29]Published by the Cooperative Test Service, 25 Amsterdame Ave., New York City

Causes of Difficulties in Oral and Written English. Difficulties which cause problems in other school subjects are similar to those found in oral and written expression. These factors include aptitude, interest, physical condition, previous failure, emotional stability, and mental ability. The home and community also play an important part in how an individual will use the English language. The teacher should be cognizant of all of these situations before making a diagnosis.

Reed makes the following statement: "The child learns to speak the language of his parents. When he goes to school or into the community, he has few means of expression except those which he has learned at home. Even after he enters school, he spends more hours at home than he does at school. Even if the school teaches correct forms, its influence is usually not strong enough to counteract the strength of his previously formed habits."[30] [redacted] Probably the main cause of deficiency in English expression is lack of experience and practice in using correct forms. Many students are not aware of their errors in English, and these errors can be corrected by pointing them out to the student, and suggesting ways of correction.

---

[30]Homer B. Reed, Psychology of Elementary School Subjects (Boston, 1938) pp. 186-187.

[redacted]

Suggestions for Improvement of English Usage. Ways for improving a student's use of English are: (1) provide time for oral and written communication; (2) provide some time for formal grammatical study; (3) emphasize practice where errors are committed; (4) relate the work to the student's own life, interests and goals.

Programs for Remedial Treatment. The Portsmouth High School, Portsmouth, Ohio followed a plan of grouping freshman and sophomore students who were having difficulty in English into one section and juniors and seniors into another section. Forty copies of a daily newspaper were used for the reading textbooks, and the students were permitted to read about thirty minutes. The remaining thirty minutes was used in oral compositions, oral discussions, and discussion of the rrrors committed. All of the basic fundamentals of oral and written English were emphasized.

## V. RELATED STUDIES

Baruch.[32] A study was conducted at Bernard M. Baruch School of Business and Public Administration in February, 1960, to determine whether a group of freshmen could improve their reading and study skills through instruction and laboratory practice. A group of students entering in February, 1960, were matched with a control group of students entering in September.

The varibles of sex, high school attended, high school average, and College Entrance Examination Scores were used in matching a control group with

---

[32]Mortimer R. Feinberg, Louis Long, and Viola Rosenheck, "Results of a Mandatory Study Course for Entering Freshmen," Journal of Developmental Psychology, V (1962), pp. 95-100.

an experimental group. The following criteria were used to measure the effect of the study course: grades at the end of first semester, scores on Brown-Holtzman Survey of Study Habits and Attitudes, scores on Appel Personality Inventory, and scores on the verbal part of the Scholastic Aptitude Test.

Based on statistical analysis of the data relating to test scores and college grades, the authors concluded that no statiscally significant changes occurred as the result of the mandatory study course.

Tennessee.[33] The authors attempted to determine whether a summer program affected first-quarter grades at the University of Tennessee. A group of students who took one or more pre-freshmen courses was compared with a matched group who did not take the courses.

The study showed that students who took the preparatory course and later enrolled at the University of Tennessee received little immediate benefit from the courses as indicated by standarized test scores and grade-point averages.

Michigan.[34] A study was conducted at the University of Michigan to determine changes in reading performance and in academic status of students who were referred to or volunteered for a corrective reading course.

---

[33]Gerald H. Whitlock and James R. Montgomery, "College Preparatory Course Work," Journal of Experimental Education," XXXI (1963), pp. 188-190.

[34]Donald E. Smith and Roger L. Wood, "Reading Improvement and College Grades: A Follow Up," Journal of Educational Psychology, XLVI (1955), pp. 151-158.

There were changes which occurred in reading performances and academic status after the application of corrective techniques. The writers were of the opinion that the results which were conveyed may have developed from other conditions rather than those presented by the corrective techniques. The study summarized that it may be too much to expect reading laboratories to improve grades and to provide continuous improvement in academic status. Provisions for continued practice in reading should be provided if permanent improvement in reading performance can be expected.

Barbe.[35] Fifty college students participated in an experiment to determine improvement and permanency of gains in reading and the effect of such gains on each individual's grades.

The conclusions were that significant gains emphasized the value of the program, gains were significant after six months, and the grade point average showed a .05 level improvement after the experiment, indicating some positive effect of the remedial reading work.

Cornell.[36] The purpose of this study was to evaluate the effectiveness of a one-semester experimental course in applied mathematics for a group of freshmen entering the College of Agriculture at Cornell University. The evaluation of the course was determined by grade-point averages, final marks in courses involving mathematics, scores on standardized mathematics tests, and tendency to remain at Cornell University.

---

[35]Walter B. Barbe, "The Effectiveness of Work in Remedial Reading at the College Level," Journal of Educational Psychology, IXIII, (1952), pp. 229-236.

[36]J. Stanley Ahman and Marvin D. Glock, "An Evaluation of the Effectiveness of a freshman Mathematics Course," Journal of Educational Psychology,L, (1959), pp. 41-45.

Results of the study did not indicate that the experimental course enhanced subsequent achievement to any significant degree; however, opinions of faculty and students were favorable concerning the worth of the course.

## VI. SIGNIFICANT RELATED STUDIES

Miami-Dade Junior College.[37] This program, action guided studies, was developed by the staff of the Miami-Dade Junior College under the leadership of Chairman Charles Strattan and Frank Branca in order to deal more realistically with individual abilities of students who enroll in an open-door college.

Nature of Program. The guided-studies program included four different programs: honors, independent study, reduced load, and basic skills. These guided studies were noncredit courses in the curriculum. The purpose was to help students to attain their maximum level of achievement through various methods and techniques. The students entered the program on the advice of a counselor.

The Florida State-Wide Twelfth Grade Testing Program or the School and College Abilities Test determined whether a freshman would be permitted or required to take one of the Guided Studies Programs. These tests applied to all incoming freshmen regardless of race, color, or creed, and if they fell below 150 on the Twelfth-Grade Test, they were expected to enroll in some of the remedial courses.

---

[37]Gordon B. Pyle, "Excellence in Action-Guided Studies." Appearing in "Excellence in Terminal Education" (an unpublished proceedings of the Third Annual College Administrative Teams Institute, 1963), pp. 67-77.

Guided Studies include: (1) Students working for honors. These students worked on special projects in addition to their regularly assigned classes under the direction of the regular classroom teacher. (2) Students working on a basis of independent study. These were selective students who were orientated to the problems, requirements, and responsibilities of independent study. (3) Students taking a reduced load because of probation or low scores on placement tests. (4) Students taking noncredit courses in reading, writing, mathematics, and educational planning because their scores fall below 150 on the Florida State-Wide Test or because they had been placed on probation.

Much interest developed in the remedial portion of Guided Studies because this was of paramount importance for the open-door college. Faculty members in these courses needed particular qualifications, and the students were "block-programmed" so that they had four instructors in common.

At the beginning of the year, students were given the Guidance Test Battery which included the SCAT and Nelson-Denny Reading Test to determine their achievement levels in various areas. A post-test session was given about the fifteenth week of the semester. Data was gathered and a staff conference was held with each instructor to discuss the students. During the first weeks, students were advised about their study habits and told how their weaknesses could be strengthened. If their problems could be pinpointed and they made sufficient progress in their remedial work, they were advised to begin a realistic program of interest to them. If not, they were encouraged to begin self-evaluation in which vocational and technical opportunities of nearby colleges were brought to their attention.

The students selected an academic program in 80 per cent of the cases. Sometimes those who had chosen pre-medicine chose alternatives satisfactory to them such as a medical technician, nurse, or medical secretary. The students received professional advice in basic planning sections and planned their programs for the next semester.

Effects of the Program. Initial studies seemed to indicate that approximately 90 per cent of the students falling below 150 on the Senior Placement Test failed in college during the first year before Guided Studies was created. In the fall of 1962, the Guided Studies Program started with a group of 356 students in the Basic or Remedial Program. Seventy-seven of the 356 students failed to register for various reasons.

One of the counseling techniques used in the basic planning classes was inviting a representative of the Lindsey-Hopkins Vocational School and Florida State Employment Service to discuss employment opportunities. As the result of this counseling procedure, ninety-one students withdrew during the Fall Semester of 1962 for immediate employment or for a specific training program offered at Lindsey-Hopkins.

Of the remainder of the Basic Studies students, eighty-nine finished the semester, but did not re-register. One hundred and sixty-one enrolled for the fall semester. Of these, 75 registered in academic courses, 66 entered special degrees programs, 14 entered technical programs, and 6 took a second semester in Guided Studies. A check on these enrolled students at the end of the spring term indicated that approximately 67 per cent had achieved a grade point average of 1.5 or above in the academic program, 60 per cent

achieved this grade point in the special degree programs, and 75 per cent in the technical program. The students who repeated Guided Studies showed no appreciable gain. Of the 161 students who took basic studies and re-registered at the junior college, 155 registered for degree programs.

A random sampling of 34 students enrolled in basic studies during the second semester of 1962-63, indicated that the reading level average for the group was tenth grade, three months, upon entrance and after completion of one semester, twelfth grade, five months, an average improvement of two years and two months.

No studies concerning improvement in mathematics were available at this time, but a comparison of the quantitative sections of the School and College Abilities Test, Form 1A, administered at the beginning of the semester and Form 1B of the same test given at the end of the semester presented some information. According to the national forms on the quantitative phases, the white students showed a gain of 12.5 percentile points and the Negroes, 10 percentile points.

Conclusions. The program has been in operation only one year at the College and further study needs to be done. However, some tentative conclusions have been advanced.

1. Approximately 10 to 12 per cent of low achievers were removed from the program until difficulties could be analyzed and possibly corrected. This preserved the open-door college and permitted the regular classes to operate effectively.

2. The majority of students in the program, having greater insight in their interests and abilities, were successfully guided into certificate programs or into industry.

3. Of the students who registered in the remedial phases of Guided Studies, a significant number (approximately 28 per cent in the Spring of 1963) subsequently entered degree programs at the college and achieved a 1.5 grade point ratio or better.

4. A substantial number of those students who successfully entered degree programs after one semester in Guided Studies altered their goals from academic to technical or occupational programs. It appeared that the program was overcoming the cultural bias in favor of academic programs.

5. Students attained a feeling of achievement and improved the quality of their performance in each of the programs by being enrolled in the guided programs where they could meet success.

Overall, the Guided Studies Program improved the holding power of the college, and consequently its income and public image while maintaining standards of excellence throughout.

North Greenville Junior College[38] The purpose of this study was to determine if a ten weeks' remedial summer program in English, mathematics, and reading enabled a group of students to compete academically during the first semester of the 1965-66 school year with a group of regularly admitted students.

The experimental group was selected from students who were required to take a ten weeks' remedial program before they could be admitted to North Greenville Junior College. The control group was selected from regularly admitted students. The pairs were matched by college board scores within plus or minus twenty points.

---

[38]Courch, James R. "An Experiment to Determine The Effectiveness of a Summer Remedial Program at North Greenville Junior College." (Unpublished Master's thesis, Furman University.)

After the summer session, students in the experimental group were enrolled in the regular college curriculum. At the end of the first semester, grade point ratios for groups were computed and statistically analyzed by means of a *t* test.

The statistical analysis disclosed that there was no significant difference in the means of the two groups. The null hypothesis therefore, was accepted. The alternative hypothesis that the experimental group would exceed those of the control group, was rejected.

## CHAPTER III

## THE STUDY

Design. Admission to Spartanburg Junior College is dependent on each student's high school transcript, college board scores, standardized tests, class rank, and the general recommendation of officials of the high school from which he graduated. The Admissions Committee analyzes these criteria and approves each application.

Students who have an overall "C" average on high school work and acceptable college board scores are considered for regular admission, if they meet conditions of other criteria listed above. However, students whose college board scores are not acceptable and who have less than a "C" average on high school wodrk in basic academic subjects (English, social studies, mathematics, and science) are approved only for a eight-weeks' developmental program of study during the summer.

Pre and post standardized tests are administered to each student, and teacher-made tests are given throughout the eight-weeks to obtain an objective measure of the student's progress and potential to achieve at the college level. Acceptance into the developmental program does not denote automatic acceptance into the regular session.

After eight weeks of developmental study in reading, mathematics, English, and group dynamics each applicant's progress is reviewed by the instructors and Admissions Committee in a joint meeting, to predict the student's ability to do college work.

The purpose of this study was to determine if a selected group of fifty-one students who received developmental treatment during the summer of 1968 could compete academically with a selected group of regularly admitted students during the first semester of the 1968-1969 school year.

Hypotheses of the problem. Two hypotheses were tested.

1. Null hypothesis at the .05 level of significance: there would not be a difference in the academic performance of the developmental group and the group of regularly admitted students at Spartanburg Junior College.

2. Alternate hypothesis at the .05 level of significance: there would be a difference in the academic performance of the developmental and regularly admitted students at Spartanburg Junior College.

Questions to be answered. Answers to these questions were sought:

1. Were the developmental students able to compete academically, as measured by grade point ratio, with regularly admitted students after having been admitted to Spartanburg Junior College from an intensive eight-weeks' developmental study program?

2. Can it be inferred that an intensive developmental program in reading, mathematics, English, and group dynamics prior to entry into Spartanburg Junior College enhances the comprehension and problem-solving ability of the prospective students?

Selection of pairs. Fifty-one pairs of students were selected for

the study, half of whom attended a eight-weeks' summer developmental program and half did not. Pairs were matched on the basis of scores on the college board examination within plus or minus twenty points. The range of twenty points was used since the scores fell within this range, although the standard error of measurement is larger than twenty points on the college entrance test.[1] See Table 1.

## I. STATISTICAL ANALYSIS

Test of Difference in Means. The statistical data presented in Table II were analyzed by a $t$ test to determine if there was significance to the difference in means. The null hypothesis was $\bar{X} = \bar{Y}$ at a .05 level of significance and with one hundred degrees of freedom $(N_1 + N_2 - 2)$.

Formulas devised by Lacey were used.[2]

$$t = \frac{\bar{D}}{S_{\bar{D}}}$$

The difference between the means of gains $(\bar{D})$ was found by subtracting $\bar{Y}$ from $\bar{X}$.

$$\bar{D} = 2.3.2 - 1.066 = 1.246$$

The standard deviation of the mean difference $(S_{\bar{D}})$ was determined by the formulas:

---

[1]Henry S. Dyer, College Board Scores, Educational Testing Service, New Jersey, 1950, pp. 30-31.

[2]Oliver L. Lacey, Statistical Methods in Experimentation: An Introduction (New York, 1953), p. 114.

TABLE I

THE COLLEGE BOARD EXAMINATION SCORES
of the EXPERIMENTAL AND CONTROL GROUPS

| PAIRS | EXPERIMENTAL | CONTROL |
|---|---|---|
| 1 | 907 | 902 |
| 2 | 893 | 873 |
| 3 | 855 | 866 |
| 4 | 832 | 817 |
| 5 | 830 | 813 |
| 6 | 830 | 810 |
| 7 | 814 | 821 |
| 8 | 811 | 821 |
| 9 | 800 | 801 |
| 10 | 781 | 768 |
| 11 | 763 | 773 |
| 12 | 759 | 765 |
| 13 | 748 | 753 |
| 14 | 741 | 753 |
| 15 | 740 | 750 |
| 16 | 737 | 751 |
| 17 | 734 | 732 |
| 18 | 726 | 730 |
| 19 | 725 | 736 |
| 20 | 711 | 729 |
| 21 | 704 | 712 |
| 22 | 700 | 704 |
| 23 | 699 | 703 |
| 24 | 699 | 695 |
| 25 | 695 | 689 |
| 26 | 695 | 687 |
| 27 | 690 | 709 |
| 28 | 684 | 696 |
| 29 | 582 | 660 |
| 30 | 678 | 677 |
| 31 | 671 | 651 |
| 32 | 669 | 662 |
| 33 | 665 | 671 |
| 34 | 659 | 667 |
| 35 | 651 | 660 |

| PAIRS | EXPERIMENTAL | CONTROL |
|---|---|---|
| 36 | 650 | 646 |
| 37 | 641 | 655 |
| 38 | 635 | 634 |
| 39 | 626 | 612 |
| 40 | 625 | 626 |
| 41 | 620 | 612 |
| 42 | 617 | 600 |
| 43 | 615 | 621 |
| 44 | 591 | 576 |
| 45 | 590 | 599 |
| 46 | 587 | 605 |
| 47 | 587 | 580 |
| 48 | 585 | 576 |
| 49 | 577 | 580 |
| 50 | 559 | 539 |
| 51 | 494 | 518 |
| TOTAL N = 51 | 35,477 | 35,586 |
| MEAN | 696 | 697 |

TABLE II

AN ANALYSIS of G.P.R.'s of STUDENTS WITH AND WITHOUT DEVELOPMENTAL TREATMENT

| PAIRS | EXPERIMENTAL (X) | DEVIATION (x) | DEVIATION SQUARED ($x^2$) | CONTROL (Y) | DEVIATION (y) | DEVIATION SQUARED ($y^2$) |
|---|---|---|---|---|---|---|
| 1 | 2.0 | -.3 | .09 | .92 | -.2 | .04 |
| 2 | 2.5 | .2 | .04 | .80 | -.3 | .09 |
| 3 | 2.0 | -.3 | .09 | 1.70 | .6 | .36 |
| 4 | 2.0 | -.3 | .09 | 1.00 | -.1 | .01 |
| 5 | 2.0 | -.3 | .09 | 1.30 | .2 | .04 |
| 6 | 1.8 | -.5 | .25 | 1.50 | .3 | .09 |
| 7 | 1.8 | -.5 | .25 | .77 | -.3 | .09 |
| 8 | 2.0 | -.3 | .09 | 1.50 | .4 | .16 |
| 9 | 1.8 | .5 | .25 | .25 | -.9 | .81 |
| 10 | 2.7 | .4 | .16 | 1.30 | .2 | .04 |
| 11 | 2.3 | .0 | .00 | .75 | -.4 | .16 |
| 12 | 2.3 | .0 | .00 | .80 | -.3 | .09 |
| 13 | 2.4 | .1 | .01 | 1.80 | .7 | .49 |
| 14 | 2.4 | .0 | .01 | 1.00 | -.1 | .01 |
| 15 | 1.6 | -.7 | .49 | .60 | -.5 | .25 |
| 16 | 2.0 | -.3 | .09 | 1.00 | -.1 | .01 |
| 17 | 3.8 | 1.5 | 2.25 | 1.20 | .1 | .01 |
| 18 | 1.8 | -.5 | .25 | 1.30 | .2 | .04 |
| 19 | 1.8 | -.5 | .25 | 1.30 | .2 | .04 |
| 20 | 2.4 | .1 | .01 | 1.30 | .2 | .04 |
| 21 | 2.4 | .1 | .01 | 2.00 | .9 | .81 |
| 22 | 3.4 | 1.1 | 1.21 | .85 | -.3 | .09 |
| 23 | 2.5 | .2 | .04 | 1.00 | -.1 | .01 |
| 24 | 1.7 | -.7 | .36 | .85 | -.3 | .09 |
| 25 | 1.5 | -.8 | .64 | 1.30 | .2 | .04 |
| 26 | 3.0 | .7 | .49 | .80 | -.5 | .25 |
| 27 | 2.8 | .5 | .5 | 1.30 | .2 | .04 |
| 28 | 2.4 | -.1 | -.1 | 1.10 | .0 | .00 |
| 29 | 2.4 | .1 | .1 | 1.00 | -.1 | .01 |
| 30 | 3.2 | .9 | .9 | 0.50 | -.6 | .36 |
| 31 | 1.8 | -.5 | -.5 | 1.00 | -.1 | .01 |
| 32 | 2.3 | .0 | .0 | 0.77 | -.3 | .09 |

| PAIRS | EXPERIMENTAL (X) | DEVIATION (x) | DEVIATION SQUARED ($x^2$) | CONTROL (Y) | DEVIATION (y) | DEVIATION SQUARED ($y^2$) |
|---|---|---|---|---|---|---|
| 33 | 2.8 | .5 | .25 | 1.30 | .2 | .04 |
| 34 | 2.5 | .1 | .04 | 1.20 | .1 | .01 |
| 35 | 1.8 | .5 | .25 | 0.20 | -.9 | .81 |
| 36 | 2.0 | -.3 | .09 | 0.80 | -.3 | .09 |
| 37 | 2.3 | .0 | .00 | 1.50 | .4 | .16 |
| 38 | 1.9 | .4 | .16 | 1.80 | .7 | .49 |
| 39 | 2.3 | .0 | .00 | 0.75 | -.4 | .16 |
| 40 | 2.4 | .1 | .01 | 0.75 | -.4 | .16 |
| 41 | 2.0 | -.3 | .09 | 0.56 | -.5 | .25 |
| 42 | 2.6 | .3 | .09 | 1.80 | .7 | .49 |
| 43 | 2.0 | -.3 | .09 | 1.30 | .2 | .04 |
| 44 | 1.8 | -.5 | .25 | 0.80 | -.3 | .09 |
| 45 | 3.2 | .9 | .81 | 1.40 | .3 | .09 |
| 46 | 2.5 | .2 | .04 | 1.00 | -.1 | .01 |
| 47 | 3.3 | 1.0 | .10 | 0.87 | -.2 | .04 |
| 48 | 2.3 | .0 | .00 | 0.50 | -.6 | .36 |
| 49 | 1.8 | -.5 | .25 | 1.82 | .7 | .49 |
| 50 | 2.0 | -.3 | .09 | 0.60 | -.5 | .25 |
| 51 | 3.3 | -1.0 | .10 | 1.10 | .0 | .00 |
| | 118.00 | | 11.80 | 54.41 | | 8.70 |
| MEAN | 2.4 | | | 1.1 | | |

$$S_{\bar{x}} = \frac{Sx}{\sqrt{N}} \qquad S_{\bar{D}} = \frac{}{\sqrt{S^2_x + S^2_y}} \qquad S_{\bar{y}} = \frac{Sy}{\sqrt{N}}$$

$$S_{\bar{D}} = \frac{}{\sqrt{S^2_x + S^2_x}}$$

$$S_{\bar{D}} = .0882$$

A $t$ value of 1.41 was obtained.

With one-hundred degrees of freedom and a .05 level of significance, the critical value of $t$ is 2.00. As the obtained $t$ was smaller, the null hypothesis was accepted. It was assumed that the difference between the means was not statistically significant.

The alternate hypothesis, that there would be a difference in the academic performance of the developmental and regularly admitted students, was rejected. The difference that was found was too slight to be considered statistically significant and can be assumed to be a chance variation in scores. It is noted, however, that the difference was positive and that it favored the experimental group.

# CHAPTER IV

## SUMMARY

The purpose of this study was to determine whether a selected group of fifty-one students who took part in a developmental program in the summer of 1968 at Spartanburg Junior College could compete academically with a selected group of fifty-one regularly admitted students during the first semester of the 1968-1969 academic school year.

The experimental group experienced eight weeks of developmental study in reading, mathematics, English, aids to study, and group dynamics, and the control group was selected from the regularly admitted student body. The two groups were matched by scores on the college board examination. During the first semester of the 1968-1969 academic school year at Spartanburg Junior College, the two groups were enrolled in basically the same courses of study and were administered teacher-made tests. At the end of the semester, grade point ratios of the two groups were compared, and the mean grade point ratios were analyzed statistically by means of a *t* test. The difference in achievement of the two groups was not found to be statistially significant. The null hypothesis was accepted. The alternate hypothesis that there would be a significant difference in scores, was rejected.

## I. CONCLUSION

Findings of this study indicate that after participating in the summer developmental program offered at Spartanburg Junior College, developmental students, who had been judged by the Admissions Committee as incapable of achieving academically at the college level without developmental help, were able to make as much academic progress as regularly admitted students. Statistical analysis shows the developmental students surpassed the regularly admitted students in academic achievement, but not to a significant degree.

It is concluded that the developmental group's achievement in subsequent academic courses on the college level provides evidence of the worth of the summer program.

## II. RECOMMENDATIONS

On the basis of data gathered in this research, the author makes the following recommendations:

1. That the developmental summer program be continued.
2. That a follow-up study of the achievement of these same two groups be made in five years to determine if there is a difference in achievement over a longer period of time.
3. That similar studies of wider scope be made in order to confirm or refute the findings of this study.

# LIST OF WORKS CONSULTED


Anastasi, A. Psychological Testing. New York. 1954.

Ahman, J. Stanley, and Glock, Marvin D. "An Evaluation of the Effectiveness of a Freshman Mathematics Course," Journal of Educational Psychology, L, (1959), 41-45.

Barbe, Walter B. "The Effectiveness of Work in Remedial Reading At The College Level," Journal of Educational Psychology, XLIII, (1952), 229-236.

Blair, Glenn Myers. Diagnostic and Remedial Teaching. New York, 1962.

Bond, Guy L. Auditory and Speech Characteristics of Poor Readers. New York, 1935.

Brueckner, Leo J., and Melby, Ernest O. Diagnostic and Remedial Teaching. New York, 1931.

Carter, H. D. "Emotional Correlates of Errors in Learning," Journal of Educational Psychology, XXVII (1936), 55-67.

Conant, James B. The American High School Today. New York, 1959.

Couch, James R. "An Experiment to Determine The Effectiveness of a Summer Remedial Program at North Greenville Junior College." (Unpublished Master's thesis, Furman University.)

DeRidder, Lawrence M. "Comparative College Success of Men and Women," School and Society, LXXV (1952), 9-11.

Feinberg, Mortimer R. Long, Louis, and Rosenheck, Viola, "Results of a Mandatory Study Course for Entering Freshmen," Journal of Developmental Psychology, V (1962), 95-100.

Fine, Benjamin. Admission to American Colleges: A Study of Current Policy and Practice. New York, 1946.

Gates, A. I. "Sex Differences in Reading Ability," Elementary School Journal LXI (1961), 431-434.

Glasgow, George M. "The Effects of Manner of Speech on Appreciation of Spokent Literature," Journal of Educational Psychology, LII (1961), 322-329.

Holland, John H. "The Prediction of College Grades from Personality and Aptitude Variables," Journal of Educational Psychology, LI (1960), 245-254.

Holland, J. L. "Some Limitations of Teacher Ratings as Predictors of Creativity," Journal of Educational Psychology, L (1959), 219-233.

Kirby, Joan Marie. "Classroom Techniques For Diagnosis and Remedial Instruction." (Unpublished Master's thesis, Southern Connecticut State College.) p. 25.

Lacey, Oliver L. Statistical Methods in Experimentation: An Introduction. New York, 1953.

Pressey, S. L. and Campbell, Pera. "The Causes of Children's Errors in Capitalization: A Psychological Analysis," English Journal, XXII, March, 1933, 71-75.

Reed, Homer B. Psychology of Elementary School Subjects. Boston, 1938.

Sherman, Mandel. "Emotional Disturbances and Reading Disability," Recent Trends in Reading Supplementary Educational Monographs, 49, The University of Chicago, November, 1939, pp. 133-134.

Smith, Donald E. and Wood, Roger L. "Reading Improvement and College Grades: A Follow Up," Journal of Educational Psychology, XLVI (1955), 151-158.

Starnes, Laura B. "An Ex Posto F cto Experiment to Evaluate the Effectiveness of a Summer Remedial Reading Clinic." (Unpublished Master's thesis, Furman University.) p. 69.

Underwood, B. J. "Verbal Learning in the Education Process," Harvard Educational Review, XXIX (1959), 107-117.

Whitlock, Gerald H. and Montgomery, James R. "College Preparatory Course Work," Journal of Experimental Education XXXI (1963), 188-190.

Whitty, Paul. Reading In Modern Education. Boston, 1949.

Wilson, G. M. "Toward Perfect Scores in Arithmetic Fundamentals," Arithmetic Teacher, I, (1954), 14-15.

Woodall, Michael Vance. "Sex Differences In Academic Performance at Furman University." (Unpublished Master's thesis, Furman University.)

Woodring, Paul. A Fourth of a Nation. New York, 1957.